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Design for a Planet

The science of ecology has been solely the concern of intellectuals too long. If modern, urban-industrial man does not learn what ecology is and place himself in balance with his environment and his fellow living creatures, ecological forces may destroy him.

Complicated though it may be in detail, the concept of ecology seems simple enough to win universal acceptance. The word was derived from the Greek word for house, *oikos*. Ecology undertakes to unravel and understand the total interactions of all organisms—plants, animals and man—with each other and with their environment. One of the great pioneers of ecological research, the late Aldo Leopold, put it this way:

> A harmonious relation to land is more intricate, and of more consequence to civilization, than the historians of its progress seem to realize. Civilization is not, as they often assume, the enslavement of a stable and constant earth. It is a state of *mutual and independent cooperation* between human animals, other animals, plants, and soils, which may be disrupted at any moment by the failure of any of them. Land-despoilation has evicted nations, and can on occasion, do it again. As long as six virgin continents awaited the plow, this was perhaps no tragic matter, — eviction from one piece of soil could be recouped by despoiling another. But there are now wars and rumors of wars which forestall the impending saturation of the earth's best soils and climates. It thus becomes a matter of some importance, at least to ourselves, that our dominion, once gained, be self-perpetuating rather than self-destructive.

When Charles Darwin wrote his *Origin of Species*, the word "ecology" had not yet been coined. Yet its essence is to be found in his concluding paragraph:

> It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. . . . There is a grandeur in this view of life [whereby from simple beginnings] endless forms most beautiful and most wonderful have been, and are being evolved.

Darwin's principle of evolution is universally accepted today, but his message of the interdependency of life has gone unheeded. Urban-oriented, 20th-century man of the asphalt jungles and penthouse gardens might seem to be far removed from the "tangled bank" Darwin

described. But despite the enormous advances in scientific and technical knowledge which have given man wings, a longer life span and the ability to bounce his words off the moon, he is still dependent on the ecological balance of his environment.

Consider four basic factors in the ecological complex: space, air, water and people. Air and water have always been considered "free" and the great open spaces inviolable. The multiplication of people is already changing this: and for the worse. Space, air and water will become priceless should the population of this country double to 360 million, as expected, in only 40 years.

About 75 percent of this population increase is expected to be in the large cities and their environs. Space, that finite factor in the ecological complex, will have prime importance as today's high urban population densities spread over larger areas.

The air is becoming increasingly polluted with waste which, in smog-infested areas, eats holes in nylon stockings, makes the eyes smart, increases respiratory illnesses and may even cause cancer.

Man has shown the most reckless disregard for ecology in his misuse of water resources. He has desecrated the beautiful rivers of this continent and many of their tributaries. When Lewis and Clark took off from St. Louis to explore the Northwest territories the water of the Missouri River could be drunk neat, without fear of infection. A recent public health report cited by *The Reporter* magazine (March 30, 1961) implies that to wash one's hands in the Missouri is dangerous; to be dunked in this devil's brew of topsoil, sewage and industrial wastes could be fatal:

> At Sioux City "floating excrement and other sewage solids were obvious, and gas bubbles from sludge deposits rose to the surface." . . . [Downstream at St. Joseph] on occasion the waters [south of the city] have become so thick that some of the hardier entrepreneurs in the area have taken to their boats and worked up a good business peddling the grease they skimmed from the surface.

Violation of the ecological balance evokes even heavier penalties than physical inconveniences and health hazards. It strikes at the very basis of human culture and civilization.

This issue reproduces two challenging statements by men who have given years of thought to the broader cultural and spiritual consequences of ignoring the ecological imperative. They see the matter from very different points of view, but the warning is clear and simple: new powers involve responsibilities as well as privileges. Man is profoundly and massively violating the ecological balance. The penalty could be no less than the destruction of modern civilization.

Man has now touched the edge of space. Can he focus his vision and imagination nearer home, repair the damage which has been done and keep this planet a fit place on which to live?

—ROBERT C. COOK, *Editor*

Population, Space, and Human Culture

by HENRY B. VAN LOON

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We, like all other forms of life, must maintain a working relationship with our environment. But while this relationship is still fairly simple and direct for all other organisms, ours is now maintained through each other, as a group, and through the patterns of behavior and the values of that group. This has given us a freedom of movement and expression that no other creature has, but, at the same time, it has also made us responsible for our own well-being. We must, therefore, seek to know ourselves and the world around us as best we can if we would insure the brightest possible future for mankind.

Space is both a measure and a function of our environment, and a resource in itself. For the lower forms of life, its values are quite tangible and easily measured; for us, on the other hand, because our relationship with our environment is no longer direct, but through our culture, it has come to have intangible ones as well. It is our appreciation of these intangible values and how they may best be implemented that determines whether and at what rate we, as a civilization, advance.

The direct and tangible relationships between ourselves and our environment have been well studied; the intangible ones have not. We can approximate how much food we shall probably have, how much coal, how much iron, by the year 2000. We can figure how much room each one of us shall have, depending on our numbers. We know very little, however, of the effect of space or lack of it on our cultural development. We do not whether or not there is a point in the decline of per capita space and resources beyond which the cultural growth of a nation is arrested, and whether or not we are anywhere near such a point.

About a hundred years ago, von Liebig wrote,[1*]

> A nation arises and develops in proportion to the fertility of its land. With the exhaustion of the land, culture and morals disappear. However, the intellectual properties of the nation do not vanish; it is our consolation that they merely change their dwelling places.

This statement not only poses a fundamental question, but also hints broadly at the answer. The question, of course, is: Why does disruption of the landscape bring about a cultural decline? The hinted answer is: The development by man of a cultural relationship with his environment has brought about

*Numbered references are to "Notes" on page 51.

a physio-psychological relationship between environment and culture within his civilization that may not be too different from the psychosomatic interrelationships that exist within the individual. The human being whose continued existence is no longer dependent on his ability to maintain rapport with his environment through change in his individual characteristics — form and function—has simply passed these requirements on to his state, nation, or civilization.

We would be deluding ourselves, furthermore, were we to think that von Liebig's thesis is rendered obsolete because of our industrial development. Industry is simply an extension of the process that began with agriculture—a capacity to exploit resources. Fertility of land has the same significance for an agricultural society, to all intents and purposes, as have total resources for an industrial one. If we substitute environment for fertility of land, von Liebig's statement immediately is brought up to date. The plain facts are that culture and environment are so intimately linked that the quality of an environment has as direct an effect on the quality of a culture as a culture, through its values, has on the space and resources of a civilization.

The relationship between primitive man and his environment could very simply be expressed: A region could support as many people as its resources times its space could feed. The relationship between us and our environment is somewhat more complicated, however, and has been expressed formulaically by Dr. Paul B. Sears, Chairman of the Yale University Conservation Program, as $\frac{(R_s)}{(P)} f(C) = 0$, in which R is resources, s is space, P is people, and C is their culture. All of these factors are variable, of course, but space, the subscript of resources, is variable not only in tangible, but in intangible ways as well. It can have endless values to us because of the cultural approach to environment that we have developed; and conversely, the continuation of our culture depends on the fullest exploitation of our space's aesthetic as well as material potential. It behooves us to study the implications of this in some detail.

SPECIFICS OF THE CASE

It is not yet 200 years since our Constitution was written and adopted. This new departure in governmental philosophy and form brought about an unprecedented degree of freedom in human-environmental relations. What is more, this occurred in a brand new land and just as man was getting hold of a new source of power—namely, steam. The consequent outburst of energy, both physical and mental, that took place was phenomenal. Free minds and strong bodies sustained by a new and fertile soil moved without hindrance in all directions, using whatever was needed of space and resources, and there was spawned such a collection of "tinkers and geniuses," as Edmund Fuller called them,[2] as had never before been seen. Few coun-

tries since Greece in its heyday have boasted as many men of genius of all kinds—in relation to its population, of course—as did ours in the early 1800's.

In a scant 150 years, however, we have converted our country from a storehouse of raw wealth and space to what may well become a slum-ridden, have-not nation; from a land of men to one of members. The signs of the conditions for social stratification and decline are everywhere evident—the disease is already well advanced in our culture. But to be more specific as to what we may do to save ourselves from going the way of other civilizations, let us review the actual state of our space and resources and see, if we can, where we now stand. It is, of course, impossible to make direct comparisons with the past or with other present-day countries with anything approaching scientific accuracy, but some valid analogies and comparisons can certainly be drawn.

On a world-wide basis, population rose thirty per cent from 1900 to 1940, while the production of food increased only ten to twelve per cent. Since 1940, world population has risen at an even faster rate than before; world food production, however, actually declined during the war and did not regain its prewar level until 1952, since which time, it has continued to increase, but not by any means at the same rate as has population.[3] Meanwhile, we have been proceeding on the assumption that because we have a "food surplus," our larder has no limits. Actually, of course, it has. Our present surplus is largely the result of a politically useful scheme by which we pay "farmers" to take the capital out of our soil, which our grandchildren should have, and deposit it to their personal accounts. This cannot go on indefinitely, and it will not.

In the late 1930's, when we were seriously worried about our future, our Government made a most exhaustive study to determine the total number of acres that might be profitably used for farming and came up with just under 500,000,000 acres. At that time, we were already using some 300,000,000 acres (we had been using almost 360,000,000 in 1930).[4] Since then, by concentrating on the best land only, using much more fertilizer, cutting down on our exports and what we feed to horses and mules, we have managed to take care of our much larger population (177,399,000 in 1959 as compared with 122,755,046 in 1930) with only about 420,000,000 acres. It has been estimated that by 1975, our population may be 225,000,000 and that to feed those people would require about 550,000,000 acres, under present productive levels. By increasing the annual amount of fertilizer from 5,500,000 tons used in the 1953-55 period to 10,600,000 tons and by applying this fertilizer to forty-eight per cent of the acreage used instead of thirty per cent, however, we could reduce the acreage to about 430,000,000.[5]

All of this looks quite promising; but this kind of performance cannot go on indefinitely. After certain levels of production are

reached, the response of the land to more fertilizer appears to be negligible. Production thereafter depends more and more on intensive cultivation. Thus, although Japan uses twice as much fertilizer as Europe and five times as much as we do, it has not been able appreciably to increase production per acre since 1935.[6]

Meanwhile, we are steadily increasing not only our total, but our per capita needs for other resources of all kinds: for sources of energy, for metals, and for other materials that are all very finite in amount. While the demand for food increases more or less arithmetically with population, the demand for all other resources appears to increase geometrically. In short, however we regard our resources, all indications are that somewhere within the next twenty or thirty years, and in some respects possibly sooner, our larder, which has seemed so inexhaustible, will turn out to be like any other barrel. Yet, ours has only recently been tapped.

In any practical sense, living space on the planet Earth is finite in amount, too. True, the thrifty Dutch continue to reclaim land from the shallow margins of the North Sea, but only fast enough to make up for fertile land lost to roads and urban use. True, also, tall apartments continue to multiply and grow taller on an expensive piece of rock called Manhattan Island, but even this ingenious scheme has its limits. By and large, therefore, we shall have to make do with the existing land surface for the foreseeable future.

For the wisest and most effective use of that surface, we shall require help from many sources, not least from science. Yet, ironically, it is the applications of science that threaten us with a crisis in our relation to the space on which we live. For science has, through lowering our death rate while our birth rate remains high, brought about an unprecedented increase in human numbers. Moreover, in raising our material level of living, science has vastly increased our demands upon raw materials. And while it has probably lessened the amount of space required to provide each of us with food, it has made necessary great new highways, factories, and other greedy consumers of space. Finally, at the same time that pressure upon space has thus been steadily growing, the utilities, conveniences, and diversions made possible by science are monopolizing our time and attention; the elaborate rituals of modern civilized life are divorcing us more and more from contact with the world of nature of which we are—inescapably—a part.

Even the word space itself begins to connote to us only outer, astronomical space. The result is a kind of mass hypnosis, a fascination with celestial form-sheets and planetary scoreboards. This may be, as we are assured by some specialists, essential to our physical survival as a nation, or it may not be. There are some cogent reasons, however, aside from expense, for thinking that the dangers may outweigh the insurance. Be this as it may, this new emphasis upon the promises of

outer space deflects our concern from the more immediate kind of space problem that involves our daily lives. When we become more concerned over Soviet priority in reaching the moon than in guiding the design and location of highways and suburbs, one wonders what will be left to arouse our patriotism. As a distinguished American once said, "A man may die in defense of his home, but not his boarding-house."[7]

The present land area of the fifty states of this country is 3,552,226 square miles (land area only); its population, 177,319,000. This same area in 1900 contained 75,994,575 people. The number of acres per capita, accordingly, has fallen during this period of time from 22.4 to 12.2. This is still a generous allowance compared with Japan, where the corresponding figure is just under one. But at our present rate of population increase, it is estimated that we shall have only about seven acres per capita in the year 2000, while in less than a lifetime of seventy years, we shall be little better off than the Japanese are today —and unless we match their skill and energy in exploiting our resources, we shall be a great deal worse off.

How much is too many people? This depends upon way of life and the values that are considered most important. Bands of hunters and fishermen may require several square miles per capita, besides wide buffer zones to protect them against outside interference. A simple farming people can get along with a few acres per capita, provided they are not dependent upon the rain that falls elsewhere and do not need anything from outside. A highly industrialized state, such as Ohio, can accommodate 9,000,000 persons in a space that was once crowded by fewer than 20,000 Indians.

But these instances are deceptive. The hunters and simple farmers may require wide buffer zones, such as "the dark and bloody ground" or the Egyptian desert, to give them sure protection against constant raids. And it is seldom that any economy above the primitive level is self-contained—it must have access to acres beyond that of its immediate occupation. Thus, of the scant million who work in Manhattan Island, 370,000 do not even live there, but commute, while the 14,049,000 who live in the Metropolitan New York area survive by virtue of the production and activity of our whole continent and lands beyond the seas.[8] To regard familiar urban densities as the universal norm for the entire habitable earth is not simply an error, therefore; it is a cruel injustice.

Several circumstances make the issue more than academic. One is a prevalent mood induced by the industrial revolution and noted long ago by Ortega y Gassett. This is a feeling never before entertained by sane mankind—that effortless abundance is the normal order of nature. As the efficiency of mass production increases, it becomes steadily more difficult to counter this idea, although unlimited mass production hastens the depletion of essential capital in the form of raw materials.

This suggests a further difficulty in the logical planning of space and numbers. The sheer and steady increase of population in a finite space offers superb opportunities for gain to those in a position of advantage. Slum properties are notoriously profitable in relation to investment and maintenance. William H. Whyte, Jr., has shown how much of the wealth of the United States has come from increased value attributable not to effort, but to the sheer momentum of increasing numbers in a space that remains unchanged.[9] This, of course, was the basis of Henry George's "single tax." This notion, that society, not the individual, should benefit by increased values not attributable to individual enterprise, has been laughed away repeatedly, only to bob up with remarkable persistence in serious discussions.

Beyond the mood of optimism and the temptation for profit is a profound biological fact. Man has become the dominant organism on earth not only because of his manipulative skill and highly developed central nervous system, but equally because of his powerful reproductive instinct. In this field of experience, powerful subconscious drive is reinforced and intensified by many aspects of consciousness. The slightest knowledge of cultural history, or even its current documentation in magazine advertising, shows this to be true. We conveniently forget that the strength of this impulse results in the advent of countless human beings whose arrival was by no means consciously invoked and whose welcome, to say the least, is dubious. Meanwhile, we have gone all out to insure the survival of as many for as long a time as possible—thus reducing the death rate, while dealing furtively and ineffectively, if at all, with the birth rate.

Again, our very attitude towards space is confused and ambivalent. Nor is this attitude unique, for the same is true as regards other resources—say, the forest and water. The forest is a source of materials and intangible values—and at the same time, our rival for space. Water is necessary for survival—yet, a convenient dumping ground for toxic wastes. Similarly, we require space for living, work, and recreation—but have gone to extraordinary lengths to annihilate it by rapid transit and communication. Thus, we both love and hate space—an inconceivably bad formula for any rational approach to intelligent planning.

PLANNING FOR THE FUTURE

Keeping in mind that both our continually growing pressure upon space and our relative disregard of its importance are ascribable to deep-seated aspects of human nature, what, in a technological sense, is involved in space-planning?

Any planning we may want to do for the future must, of course, be predicated on a thorough understanding of the conditions to be met and the objectives to be attained. It is obvious that we face an inexorable decline in our total resources, no matter what new ones we may find. It is obvious, too,

that we shall increase the rate at which we use them for some time at least, especially those that are most available. There will also be a continuing shortage of food on a worldwide basis until the rate of population increase is brought under some kind of control. Lastly, our space, that ten per cent or so of the surface of the globe that is fit for human habitation, has been most badly used and has deteriorated. Thus, in our formula, both resources as a whole and space in its tangible form have been reduced so markedly that any chance of maintaining a balance in the future will depend on how soundly we plot our course, how fully we take advantage of those values that are intangible.

Now, for our objectives. Obviously, we want to survive. But are we willing to settle for physical survival alone—or, rather, can we? Can we take it for granted that so long as we can keep ourselves, as a species, alive, we shall automatically continue to evolve and be able to cope with life's demands for improvement and change as they come along? Shall we not be taking a truly great chance if we decide to take no responsibility for our continued cultural growth but rather leave it up to nature? Is it not possible that having once taken on the responsibility for our own evolution to a fair extent, we may already be beyond what might be called a point of no return; that we may already be so far along that road that any failure to take the responsibility for our continued growth, to develop the right cultural values, to use the space we have left correctly, physically as well as aesthetically, may bring to an end our freedom from the control of physical, adaptive evolution?

Our cultural evolution has enabled us to increase in numbers. Thus, it has greatly increased our chances of bringing forth the minds that could move our culture onward. But—and this is the key to the whole problem—cultural gains have always been made in those countries that have had the resources; and always when the ratio of men to resources has become too high, the intellectual properties of the country have vanished, as von Liebig wrote, to reappear somewhere else. Now there are no new lands to which our intellectual properties can go if we spoil the ones we have. Our continued cultural evolution, our lives as men, thus depends on how we exploit our environment.

Specifically, we should begin now on the following two-part program: planning for the immediate future, and planning for the years beyond. Part one should be a continuation of the investigation into the tangible values of our environment, or space. Part two should be an investigation of the intangible values and an attempt to integrate them with the tangible values, so that we can learn how to make the most of our environment's aesthetic potential, in order to compensate for the loss of space and resources that we must inevitably face.

From the point of view of its use to us, the value of our space—our land—is declining rather rapidly,

although increasing in cost, for two very definite reasons: the one, because we are not yet taking the trouble to find out the ultimate best use or uses of each piece of land before doing something with it; the other, because we must use more and more machinery and can thus use only those lands or resources that can be handled by it. This is true whether we are speaking of farms, coal mines, or land for subdivision. In almost every case, the machine now largely determines what we do and where; and this is becoming the rule in almost every country as it, too, is forced to use more and more machinery.

There is a definite need, then, to extend the principle of multiple-use planning, as understood by foresters and conservationists, to land-use management as a whole, and to then integrate with this work a thorough understanding of the conditions that have been introduced in resource development and land-use by our increasing reliance on machinery and the growing interdependence of our economy. This does not mean that we should try to set out in detail how each piece of property is to be used; that would lead precisely to the kind of regimentation we must avoid. But it does mean that we should begin to develop means by which to arrive at fairly good estimates of the various possible values to us of any particular lands or regions, and an order of priority for those values. With these, we can then set up the guidelines within which free enterprise can operate without the risk that one man's work will spoil another's. This is now being done, of course, in a small way through zoning in our communities; it is being done in a larger way by our valley authorities. The principle must, however, be extended and combined with the conditions set by our technology to bring about an understanding of how our land—our space—should be managed best to meet our present-day needs.

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At the same time, we know almost nothing of the intangible values of our environment—of space—or their effects on us as individuals and as a group. The effects of space, of form and color, on man have been known for centuries by our master builders or architects: the lines of columns in the Egyptian temple to overawe the populace, the peace and sanctuary of a Gothic chapel, and so on. But we know very little of why these things are so; and because we have not been able to give these effects a statistical measure, the public, which is apt to think that statistics and truth are synonymous, is very reluctant to admit their existence or validity.

Yet, this subject must be mastered, just as we had to develop and bring together the body of knowledge that is now known as the science of psychology. The presently intangible values of our environment can have as profound effects on us and on our culture as do the physical, tangible ones. We must know them, have some measure of them, and be able to use them in order to keep the "R_s" (resource-

space) factor in our formula as high as possible, and for as long as we can.

This brings us to the last and most important point: the place of the legislator and the lawyer in the whole scheme of our cultural life process. Our laws are, in some ways, much older than our present culture. They are an extension, in part, of the controls and rights we felt instinctively when our relationship to the world around us was still physical; the conventionalization, for the rest, of those concepts as to how we should live together that we have worked out for ourselves. The speed and security with which our culture can move ahead will depend largely on how well we are able to judge the moral rightness and cultural worth of the course that our scientists say we should follow. It is in this that our lawyers must help us, for our culture can be no better than the concepts on which it is based; and those concepts can do no good until they are translated into workable arrangements for our daily use. The scientist and the lawyer must work together closely in the interest of mankind; the scientist to give us facts, the lawyer to help us make them useful.

There is a need now to establish some organization, or group, of scientists and lawyers to begin to draw together all that we know on the whole subject of our cultural relationship to our environment. This group should not be large; it might well be patterned on the one brought together by President Hoover some years ago to study the social trends of the nation.[10] It should not try to carry out research itself; it should rather act as a steering committee and clearing house for information, working through regional organizations to gather information on our resources, space, and needs, advising on research, and bringing together and making useful all work now being done by others that could increase our knowledge of our interrelationship with our environment. In this way, we may be able to learn how to establish a successful working arrangement with our environment within the time we can afford. After all, another 2500 human beings moved in to share our living space while you were reading this.

NOTES

1. Justus von Liebig, *Familiar Letters on Chemistry* (1844).
2. See Edmund Fuller, *Tinkers and Genius* (1955).
3. Harrison Scott Brown, James Bonner & John Wier, *The Next Hundred Years passim* (1957).
4. *U. S. Department of Agriculture Yearbook*, 84-110 (1938).
5. Brown, Bonner & Wier, *op. cit. supra* note 3, *passim*.
6. *Ibid.*
7. This remark has been ascribed to Henry A. Wallace.
8. *World Almanac*, 303 (1960).
9. Whyte, *Urban Sprawl*, Fortune, Jan. 1958, p. 103.
10. See President's Commission on Social Trends, Report (1933).

Better Living Through Conservation Planning

by SANFORD S. FARNESS

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The topic I have been asked to discuss refers to the obvious need for general environmental planning, placing emphasis upon our natural and cultural environment as a "dwelling place"—our habitation on earth.

I assume that you are all aware of the need for such environmental planning and that we do not have such planning in process anywhere today. We have only various kinds of disconnected, partial efforts at environmental design — metropolitan and urban planning, rural programs of various kinds and water programs mainly at the Federal level. Also, I am not going to identify the numerous and growing catalogue of defects and complaints regarding our external environment which range from metropolitan air pollution at one pole of our society, to continuing soil erosion at the other. Neither am I going to resume that perennial practice of trying to "adequately define conservation." Perhaps we can agree that neat, precise definitions of the broad-ranging attitudes comprising conservation thought must always be partial and to that extent misleading.

I would like briefly to characterize some needed human capacities which we will have to painfully acquire as individuals before we can really achieve "conservation planning for better living," and realize vitally important conservation values in our society. If enough of us choose to personally fulfill these needs of our time we will then automatically open up possibilities for transforming our environment, which after all, is only a direct reflection of ourselves at any time.

FIRST NEED—REALIZE OUR POSITION IN HISTORY

Where do we stand today—what are some main limitations which, if overcome, can open transforming possibilities? Every age is an age of transition, but each age has certain unique characteristics. Our age and its problems properly began with the Renaissance. Man's individual awareness of himself—of his ego—then took place on a broad front for the first time. This was part of a mysterious new capacity for perception and thought. Directed inwardly it produced individualism. Directed outwardly it produced scientific behavior and knowledge. Political democracy, awareness of freedom, Western scientific knowledge, our present view of nature, and technology, with all of their positive and negative quali-

ties, are quite recent gifts of the last four hundred years—gifts which suddenly are now diffusing over and transforming the entire non-Western world.

Man's present sense of himself and nature is therefore really quite new. Western culture has in fact just passed its graceful childhood period—a childhood which began in ancient, pre-Christian times and now has reached a dubious adolescence. Our present landscapes and settlement patterns are expressions of all the disharmonies, conflicts, strengths, and awkwardnesses of cultural adolescence. Much of the unconscious beauty and harmony of childhood has flowered in the settlement patterns of historical times. We travel with longing to historical examples of early landscapes, cities, towns and countrysides still present in Europe like ghosts of our forgotten past, expressing all of the profundity and completeness of uncorrupted children.

At home we confront in despair our adolescent vitality running away with us in a violent urge to produce and consume. We confront our lack of balance and sudden giantism in metropolitan growth with our embarrassing acne of urban and rural slums, our infected rivers and our eroded and scarred landscapes. We confront in dismayed surprise our recent ignorance and disregard of fundamental biological and ecological principles which earlier peoples often intuitively recognized and expressed in their settlement patterns.

SECOND NEED—TO CLEARLY DISTINGUISH CAUSES FROM EFFECTS

We are also confused yet and do not speak clearly about cause and effect relationships. Our fathers have advised us in years past that adolescence is a difficult time, full of crises, and some of our elders still living among us have forewarned us that life is difficult, that the vine is known by its fruits, that a little knowledge is a dangerous thing, and that "know thyself" is a venerable rule of wisdom. But like true adolescents, we have refused to listen. Our inner and outer conflicts are growing however and the work of our hands, our cities and landscapes, are beginning to pall on us.

We are also prone to conveniently identify the causal factors behind our problems as external causes—technological change, economic forces, lack of proper legislation, the structure of governmental agencies, and a host of others. In small ways though we have been forced to confront ourselves and already secretly know that we will sooner or later be forced to turn our fascinated eyes away from our settlement patterns and learn who we are and what part we had in creating them. Our secret knowledge tells us that if we do this it will clarify much. We can then turn our gaze back to our environment and clearly recognize ourselves in what we see.

We will then realize afresh an old principle—that man creates and is responsible for his world—that every man is an artist because

everything he creates is expressive of his purposes—including the forms of his knowledge.

If our countrysides and cities are ugly, it is because we lack a personal will for beauty. If our community structure has dissolved into chaos it is because we have lost our personal capacity for community life. If our central business districts look like slick, giant supermarkets and our farms and rural landscapes look like vast factories for resource conversion it is because we have no higher purposes than producing and exchanging commodities. If we have dishonest and shallow architecture it is because we express these qualities.

Need we go on? These points are truisms, but they are so fundamental they are easy to overlook. They bring clear a fundamental limitation facing environmental planning today—the continuing refusal to accept personal human decisions as the basic causal factors creating our settlement patterns and their problems. Most of the problems we identify and research are symptoms. This state of affairs raises to fundamental importance questions having to do wtih how we create our knowledge, our research methods, our conceptual systems and, in brief, the theory of knowledge underlying present environmental research.

THIRD NEED—MORE REALISTIC AND PENETRATING RESEARCH PROCEDURES

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We annunciate pious, elaborate statements about our lack of understanding of our settlement patterns and state that vast quantities of objective and theoretical research are needed. Serious evasions of reality are becoming more and more apparent as our national establishment for settlement pattern research grows in size and annual outlay.

Cultures and settlement patterns are materializations of man's thought forms. Man is given the world of natural forms and principles. Within it man creates his own forms and principles.

If we don't understand how our settlement patterns came to be, then we need to study the creator of these forms—man. Every cultural artifact is an effect of human thought and purpose as cause. We can read and understand these causal factors in the forms around us if we have the will to do it. Our cities, villages, countrysides and technology are a clear, legible alphabet of forms. There is no mystery about them or need for abstract theories of settlement forms after the analogy of mechanics, physics, or organics.

Let us take our settlement patterns as our alphabet of physical forms and read them directly for what they say. Man is man because he can't help being an artist—everything he does is expressive—it has form (pattern) and meaningful content. Form is man's alphabet as well as nature's. Let us, in short, have some environmental research in terms of human purposes and meanings. Let us correlate environmental problems and forms with human thought content. We will then be able to separate effects from causes in our research and

open doors to future settlement patterns truly expressive of ecological principles and of man's unfolding inner nature. It is inconceivable that man's outer world should not mirror his inner nature. The two are one.

FOURTH NEED—DEEPER PERCEPTIONS AND CONCEPTIONS OF NATURE AND MAN

If we are to create humane possibilities for environmental design—for a healthy equilibrium between man and nature in our metropolitan areas, regions, watersheds and localities—we need fresh and deeper perceptions and conceptions of both man and nature. Otherwise in our present mood we will completely ravage nature and turn ourselves into automatons.

One of the breath-taking aspects of American history is the very brief span of years required for only a handful of people to exhaust and deplete vast amounts of forests, soils and wildlife. It is apparent that formidable human purposes were inwardly acceded to and at work in the 19th century.

Let us note here, under the theme of this conference, that "People Pose the Problems" of conservation not only or primarily because of sheer quantitative population pressures, but through the purposes and knowledge inwardly selected for realization in life.

* * * *

Prior to the 16th century and the "Age of Science," there existed an intimate, concrete and personal contact between man and nature. In a sense man and nature were one. Now this oneness between man and nature is largely lost.

In our subsequent one-sided emphasis upon producing and consuming in our commercial culture we have acceded to viewing nature and ourselves almost entirely in terms of exchange value—as commodities. A commodity has no "being," no self-determination, no inner formative principle. A commodity has a "price." Commodities can be manipulated and organized as means toward monetary ends—as pure "resources." So we commonly speak in our researches and conservation work today of "natural resources" and "human resources."

The term "resources" is a narrow utilitarian concept and its widespread adoption indicates that this is the way we now prefer to view nature—as a set of commodities completely subverted to the price system and human consumption. But to view the earth as primarily a set of resources for conversion into our happiness is surely a dream of our adolescent years—now, perhaps, turning into a bad dream and possibly into a future nightmare. And we persist in speaking about ourselves as "human resources" as if man could be other than his own end.

How can we awaken to truer thoughts and perceptions of man and nature? Surely not by simply extending quantitative methods and inorganic science. In the near future we can look forward to absorbing whole sets of regional surveys and resource inventories into exquisitely complex computers and running elaborate tests of alternative resource development schemes.

This will bring us no further along the path toward enlightened development of our environment if our present concepts are still at work. Quantitative methods are of course necessary and are a great human achievement. What is now necessary is to go beyond them.

Western culture was the first to manipulate nature through the primary "scientific" concepts of motion and number and we have been taken in by them. We have learned to apprehend nature as matter made up of atoms, electrons, and, as of late, mysterious energy. Our perceptions of the formative living principles inherent in organic nature are almost completely repressed. Urban man under the spell of abstract monetary and physical concepts and locked up in cities, is now progressively estranged from a living experience and awareness of biological principles. The ancient bonds between man and nature are getting very weak. We cannot effectively relate our sense of responsibility, our weakened feelings or principles of ethics to nature if it is conceived as systems of electrons, energy or atoms.

It is time for our concept makers —our researchers—to make some clearer distinctions between the inorganic, the organic and human realms. In this way we may again recover a sense of the realities in nature and man beyond the quantitative that will open new possibilities for designing our environments.

Organic nature also presents itself to us not as just abstract matter or energy, but as something actively forming and expressing itself in the world. To understand it at this level we need to develop concepts adequate to these formative principles. We can then humanly relate ourselves to nature because we inwardly experience and express our own formative principles.

The kind of thought that we attach to our sensory impressions actually creates our facts, our conclusions and our meanings. In this sense when we perform research and create knowledge, we choose and determine our consciousness of the world. Up to now we have preferred to obscure our role in this regard.

The future possibilities for beautiful and balanced environments are bright if we choose to first understand and then bring into living ecological harmony the creative, formative principles evolving in both nature and ourselves. This will require, however, that we reject and then push beyond our reductive, quantitative notion of "natural resources" which is determining much of our conservation approach today. Whether we do this or not is an ethical choice.

FIFTH NEED—UNIFIED ENVIRONMENTAL DESIGN

This need involves healing the split between urban-oriented planning and watershed planning.

Regional planning has evolved only recently and its scope and methods are still in an experimental, formative stage. City planning, on the other hand, with roots that reach back into ancient civilization, has emerged in the United States since World War II as a wide-

spread field of activity with relatively standardized theory, procedures and scope. It is focused upon improving the physical environment and guiding the future growth of individual cities.

The beginning of *regional metropolitan planning* in America dates only from the 1920's when metropolitan problems began to receive serious attention. Los Angeles County created the first Regional Planning Commission in 1922. The first completed regional plan, "A Regional Plan for New York and Its Environs" was privately sponsored by the New York Regional Planning Association in the 1920's.

The beginning of *regional watershed planning* is also quite recent, dating from the 1920's. Three basic and related ideas and their application have been progressively evolving since that time. These are: (1) the multiple use concept, (2) the watershed unit approach, and (3) unified environmental development.

The historically separate origins of metropolitan and watershed regional programs have resulted in separate and distinct education, theory, methods and institutionalization. These factors are now creating unfortunate limitations in solving environmental problems and needs when urban and watershed problems are interdependent. Unrealistic distinctions between urban and watershed concepts are being perpetuated in existing planning agencies, in university planning curricula and in the inherited structure and functions of local, state and federal resource-connected agencies.

As mentioned earlier, the first environmental planning programs in America had their origins in the city. This resulted in a deep preoccupation with urban land use problems. The postwar metropolitan regional programs of today have not overcome this limitation. They do not commonly use concepts and procedures adequate to modern environmental problems. Natural elements—land, water, space and the sustaining larger environment —have not come into full focus as important basic elements in a healthful and desirable human environment. Consequently, factors such as regional stream pollution, agricultural problems, water allocation, open space, flood plain protection, recreation facilities, waste disposal and conservation needs receive inadequate consideration in most metropolitan programs.

On the other hand, this urban one-sidedness has been paralleled by specialized water, flood control and agricultural programs of the many federal, state and local agencies ranging from the Corps of Engineers to County Soil Conservation Districts. Many of their activities are fine examples of land-water studies. However, most of their programs unfortunately ignore the growing urban character and interrelationships of the problems and needs of our society. In many of their studies and programs it appears as if urban populations and cities hardly exist. This constitutes another one-sided approach to current environmental problems.

Present trends point to a vast increase in the regional diffusion of urban settlement with a resultant intermixture and blending of rural and urban environments. It is becoming apparent that present urban-oriented regional programs and present water-land oriented programs will not be adequate to deal with the new problems. Integrative adaptations are needed in professional educational curricula, in government agency functions and in the concepts and procedures of planning agencies. Our physical environment has been excessively divided and fragmented among specialists in urban areas, agriculture, land, water, public health, recreation and so forth in both education and government practices. A great many subject specialists, agencies and citizens are without coordinative concepts and factual data that permit awareness of present environmental interdependencies.

Important innovations in our times are the diffusion of urban population and activities across farming areas, the urbanization of farm populations, limited access highways, mass automotive transportation, vastly increased agricultural and industrial production, intensive use and consumption of natural resources, urban metropolitan aggregations, large and complex sewage treatment and water supply systems, mass recreation needs and pursuits and increasing incomes and leisure time. Most of these social and technological changes are only at their beginning. The problems created and the characteristics and needs of the future are in many respects already apparent. They require unified environmental study and design, integrating the heretofore one-sided procedures and concepts of metropolitan and water-land planning, for solution. Balanced attention needs to be given to all aspects of the environment—to water, land, agricultural, urban, industrial, residential and recreational needs.

In this context, land and water emerge as closely related resources. All human activities involve the use of both elements with varying effects. Water and land can no longer be meaningfully analyzed, developed or allocated in isolation from each other. Because water resources are more critical than land resources, watershed factors and water-use decisions will play a leading role in determining future environmental health conditions and economic development possibilities.

Conservation and nature management objectives in an urban age must now consider the total environmental complex as a problem in applied ecology. Conservation objectives need to be extended to urbanism in all its forms, including urban planning as one mode of land-water use and management.

And correspondingly, urban planning must extend its concepts to include all conservation principles and techniques. An urban plan for a city or metropolitan area is at the same time a general plan for land-water development, use and management, although this fact is not kept in awareness or made explicit under present urban planning practices.

An urban age, with ninety percent of our future population expected to live in cities and metropolitan complexes, clearly demands some form of unified environmental design. This will also be necessary for the creative reshaping of present metropolitan environments. It is a sobering commentary and rude shock to our scientific and technological pride to realize that we have not even mastered the elementary need for providing our urban populations with pure water and air. Such an attempt would require a fundamental transformation of our urban patterns.

Because of the absence of operative ecological principles in our perceptions and thought habits we find the following contradictions.

The whole history of American urbanism has been based upon the notion of growth as indefinitely extended. A state of relative equilibrium or balance, which is central to ecological insights, is defined as something abnormal or degenerative.

Quantitative concepts convert the earth successively into resources—commodities—dollars. Nature ends up obscured and obliterated in the statistical and monetary tables of economic base studies. We no longer see the elements of nature represented or symbolized, and any sense of limits is lost.

Conservation planning holds out great promise but it is apparent there is great work to be done.

ETHIC AND EXPEDIENCY

When god-like Odysseus returned from the wars in Troy, he hanged all on one rope some dozen slave-girls of his household whom he suspected of misbehavior during his absence.

This hanging involved no question of propriety, much less of justice. The girls were property. The disposal of property was then, as now, a matter of expediency, not of right and wrong.

Criteria of right and wrong were not lacking from Odysseus' Greece: witness the fidelity of his wife. . . . The ethical structure of that day covered wives, but had not yet been extended to human chattels. During the three thousand years which have since elapsed, ethical criteria have been extended to many fields of conduct, with corresponding shrinkages in those judged by expediency only.

. . . An ethic, biologically, is a limitation on freedom of action in the struggle for existence. An ethic, philosophically, is a differentiation of social from anti-social conduct. These are two definitions of one thing. The thing has its origin in the tendency of interdependent individuals or societies to evolve modes of cooperation. The biologist calls these symbioses. Man elaborated certain symbioses called politics and economics. Like their simpler biological antecedents, they enable individuals or groups to exploit each other in an orderly way. . . .

—ALDO LEOPOLD in *The Conservation Ethic*

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